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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/767,330	01/30/2004	Yoshihiko Nagamine	K2020.0002/P002	5218

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EXAMINER	
ARTMAN, THOMAS R	
ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 06/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/767,330	NAGAMINE ET AL.	
	Examiner	Art Unit	
	Thomas R. Artman	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *01/30/05; 06/22/05; 03/31/05*
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-9, 11-13 and 15-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Blair (US 5,825,845).

Regarding claims 1 and 17, Blair discloses a patient positioning device for positioning a patient couch (Figs.1 and 2), including:

a) an X-ray emission device 106,

b) an X-ray entry device 112 for receiving the X-ray emitted from the emission device and outputting an output signal (arrows in Fig.1) depending upon the received X-ray,

c) an image information generator for generating second image information regarding a portion of the patient 108 lying across the path 146 of the particle beam by using the output signal outputted from the X-ray entry device (col.6, lines 23-30),

d) a processing unit (Fig.6) for executing pattern matching 422 between a first image information 106 in a first set area including an isocenter, the first image information representing a tumor in the body of the patient, and the second image information 416 in a second set area including a position corresponding to the path 146 of the charged particle beam, thereby

producing information 426 used for positioning the couch 150 (col.3, line 56, through col.4, line 18).

With respect to claim 2, Blair further discloses a couch controller (not shown) for controlling the movement of the couch according to the positioning information.

With respect to claim 3, Blair further discloses that the processing unit executes the pattern matching by using information of a plurality of pixels contained in the first image information in the first set area and information of a plurality of pixels contained in the second image information in the second set area (see at least step 422 of Fig.6).

With respect to claim 19, Blair further discloses that the X-ray emission device is mounted to the particle beam irradiation system such that it can be moved to first and second positions which correspond to being moved into and out of the path 146 of the charged particle beam, respectively, and further where the X-ray emission device emits in the first position (col.6, lines 23-53).

Regarding claim 5, Blair discloses a patient positioning device for positioning a patient couch (Figs.1 and 2), including:

a) an X-ray emission device 106,

b) an image information generator for generating second image information regarding a portion of the patient 108 lying across the path 146 of the particle beam by using a signal depending on the X-ray emitted from the X-ray emission device (col.6, lines 23-30),

c) a display unit 420 for displaying first image information representing a tumor in the body of the patient and serving as a reference including the isocenter, and the second image information, and

d) a processing unit (Fig.6) for setting a first set area including the isocenter (steps 406 and 410) with respect to the first image information, setting a second set area including a position corresponding to the path 146 of the charged particle beam with respect to the second image information (step 416), executing pattern matching 422 between a first image information 106 in a first set area and the second image information 416 in a second set area, producing information 426 used for positioning the couch 150 (col.3, line 56, through col.4, line 18), and outputting information for displaying respective frames of the first and second set areas to the display unit (step 420).

With respect to claim 6, Blair further discloses that the display unit has first and second display units 130 and 132 for displaying the first and second images.

With respect to claim 7, Blair further discloses that the image information generator has an X-ray transducer 114 for converting the X-rays to visible light and a camera 116 to capture the light and produce the second image information.

With respect to claim 8, Blair further discloses that the image information generator further has a camera 116 that has the semiconductor-based detector structure as claimed.

With respect to claim 9, Blair further discloses that the processing unit executes the pattern matching by using information of a plurality of pixels contained in the first image information in the first set area and information of a plurality of pixels contained in the second image information in the second set area (see at least step 422 of Fig.6).

Regarding claims 11 and 18, Blair discloses a patient positioning device and method for positioning a patient couch (Figs.1 and 2), including:

a) an X-ray emission device 106,

b) an image information generator for generating second image information regarding a portion of the patient 108 lying across the path 146 of the particle beam by using a signal depending on the X-ray emitted from the X-ray emission device (col.6, lines 23-30),

c) a display unit 420 for displaying first image information representing a tumor in the body of the patient and serving as a reference including the isocenter, and the second image information, and

d) a processing unit (Fig.6) for:

e) setting a first set area including the isocenter (steps 406 and 410) with respect to the first image information representing a tumor in the body of the patient and serving as a reference,

f) setting a second set area with respect to the second image information and having substantially the same size as the first set area and including a position corresponding to the path 146 of the charged particle beam with respect to the second image information (step 416),

g) executing primary pattern matching 422 between a first image information 106 in a first set area and the second image information 416 in a second set area in order to determine a primary matching area with respect to the second image information, and

h) executing secondary pattern matching between the first and second first and second set areas 424 for producing information 426 used for positioning the couch 150 (col.3, line 56, through col.4, line 18).

With respect to claim 12, Blair further discloses a couch controller (not shown) for controlling the movement of the couch according to the positioning information.

With respect to claim 13, Blair further discloses that the processing unit executes the pattern matching by using information of a plurality of pixels contained in the first image information in the first set area and information of a plurality of pixels contained in the second image information in the second set area (see at least step 422 of Fig.6).

With respect to claim 15, Blair further discloses that the processing unit outputs information for displaying the first and second image information to a display unit that displays the first and second image information.

With respect to claim 16, Blair further discloses that the display unit has first and second display units 130 and 132 for displaying the first and second images.

Regarding claim 20, Blair discloses a particle beam generator (Figs.1 and 2), including:

a) a particle beam generator (Fig.2),

b) a particle beam irradiation system 102 for irradiating a charged particle beam supplied by the particle beam generator to a tumor of a patient 108,

c) a couch 150 for supporting the patient,

d) a patient positioning device (Fig.1), including:

e) an X-ray emission device 106,

f) an X-ray entry device 112 for receiving the X-ray emitted from the emission device and outputting an output signal (arrows in Fig.1) depending upon the received X-ray,

g) an image information generator for generating second image information regarding a portion of the patient 108 lying across the path 146 of the particle beam by using the output signal outputted from the X-ray entry device (col.6, lines 23-30),

h) a processing unit (Fig.6) for executing pattern matching 422 between a first image information 106 in a first set area including an isocenter, the first image information representing a tumor in the body of the patient, and the second image information 416 in a second set area

including a position corresponding to the path 146 of the charged particle beam, thereby producing information 426 used for positioning the couch 150 (col.3, line 56, through col.4, line 18), and

j) a couch controller and couch driver (not shown) for controlling the movement of the couch according to the positioning information.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4, 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blair, as applied to claims 1, 5 and 11 above, in view of Maurer (US 6,560,354).

With respect to all the above claims, Blair does not specifically disclose the pattern matching method used, particularly the use of a least squares algorithm.

Maurer specifically teaches such an algorithm for pattern matching, where such methods are known, efficient ways of performing the function (col.2, lines 8-13).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the processor of Blair to perform pattern matching with a least squares algorithm as it is commonly used in the art for such a purpose.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Alder (US 5,207,223) teaches an active, real-time patient positioning device with X-ray imaging devices for pattern matching between subsequent images in order to reposition the patient couch as necessary. Kunieda (US 6,307,914) teaches a similar active, real-time positioning device to that of Alder, except that the radiation therapy source, not the patient, is moved.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R. Artman whose telephone number is (571) 272-2485. The examiner can normally be reached on 9am - 6:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas R. Artman
Patent Examiner

Craig E Church

Craig E. Church
Primary Examiner